South Coast Air Quality Management District

Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (AB2588)

June 2011

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1. INTRODUCTION

This guidelines document is a supplement to a document prepared by the State of California Office of Environmental Health Hazard Assessment (OEHHA) and entitled, "Air Toxics Hot Spots Program Risk Assessment Guidelines" (referred to as the OEHHA Guidelines).[1] Facilities required to submit risk assessments to the South Coast Air Quality Management District (AQMD) under the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB2588) must follow the OEHHA Guidelines. While the information provided in the OEHHA Guidelines is complete, there are several areas in which the user is referred to their local air districts for specific or additional requirements. This supplemental guidance addresses those and other issues that have arisen during the implementation of the AB2588 Program.

A certification form must be submitted to the SCAQMD with all documents and correspondence relating to health risk assessments.[2]

Please visit the subject links provided below for additional information and documents. Questions regarding this document, health risk assessment methodology, and other AB2588 issues should be directed to the following persons at the telephone numbers indicated in Table 1.

Table 1. Contact Information.

	Web link	**Staff**	**Phone No.***
Forms	http://www.aqmd.gov/prdas/AB2588/AB2588_forms.html	Yi-Chia Chao	ext. 2705
Prioritization	http://www.aqmd.gov/prdas/AB2588/AB2588_B2.html	Victoria Moaveni	ext. 2455
Inventory reports	http://www.aqmd.gov/prdas/AB2588/AB2588_B1.html	Victoria Moaveni	ext. 2455
Risk Assessment	http://www.aqmd.gov/prdas/AB2588/AB2588_B3.html	Yi-Chia Chao	ext. 2705
Dispersion Modeling	n/a	Tom Chico	ext. 3149
Fees	http://www.aqmd.gov/prdas/AB2588/AB2588_B6.html	Pierre Sycip	ext. 3095

* All phone numbers begin with (909) 396-

Send correspondence to the appropriate person at the following address:

South Coast Air Quality Management District
ATTN: *Contact Name*
AB2588 Section
21865 Copley Drive
Diamond Bar, CA 91765

2. OVERVIEW OF THE AB2588 PROGRAM

In 1987, the California legislature adopted the Air Toxics "Hot Spots" Information and Assessment Act; also known as Assembly Bill 2588 (or AB2588). The goals of the Act are to collect emissions data, identify facilities having localized impacts to determine health risks, and notify affected individuals. There are five important components to the program as follows:

- *Emissions Reporting* - Facilities submit an air toxics inventory through Annual Emissions Reporting (AER) Program.
- *Prioritization* - From the reported toxic emissions, SCAQMD staff prioritizes facilities, using a procedure approved by the Governing Board, into three categories: high, intermediate, and low priority.
- *Risk Assessment* - High priority facilities must prepare a health risk assessment (HRA).
- *Public Notice* - If the risk reported in the HRA exceeds specific thresholds, then the facility is required to provide public notice to the affected community.
- *Risk Reduction* - Facilities with health risks above the action risk levels in Rule 1402 must reduce their risks below the action risk levels to the community.

The Program is illustrated in Figure 1 and explained in more detail in the following sections.

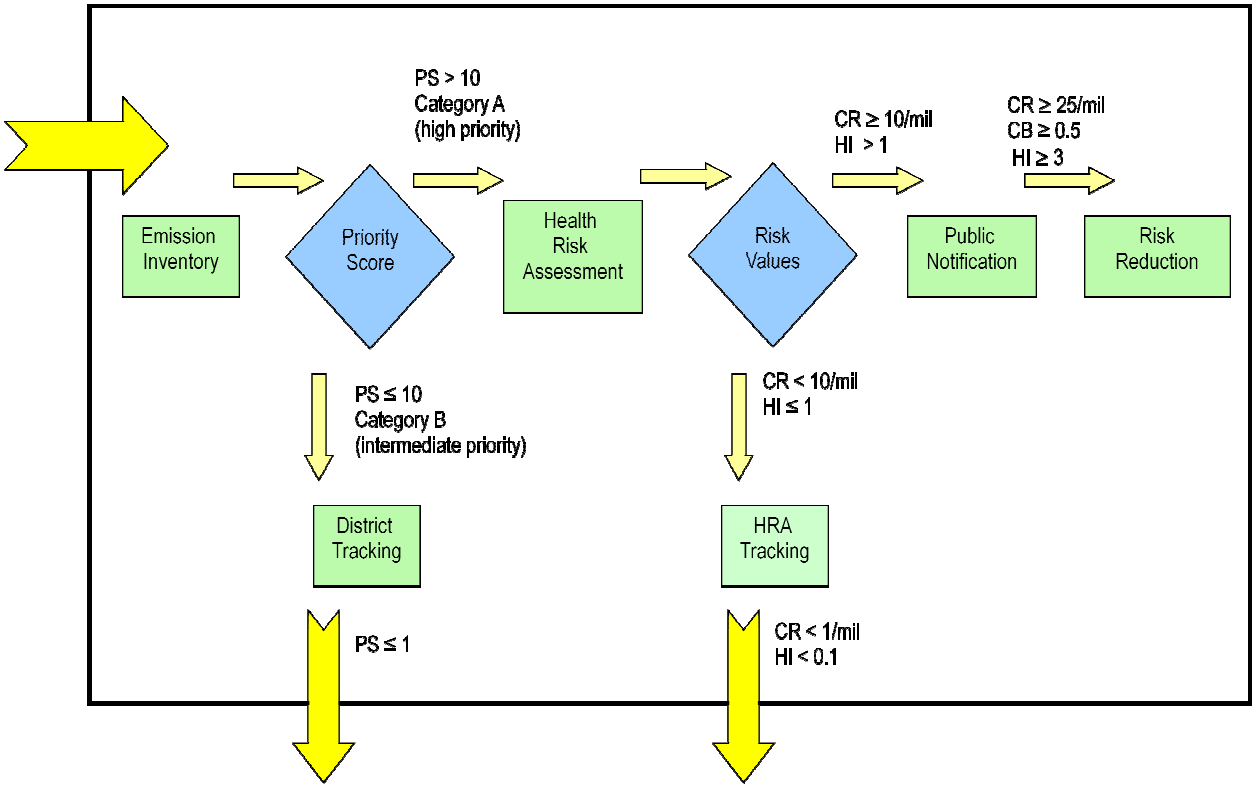

Figure 1. Schematic of the Hot Spots Program.
(CR = cancer risk; PS = priority score; HI = hazard index; CB = cancer burden)

3. GUIDELINES

Guidance and policy procedures are provided for various aspects of the AB2588 program in this section.

3.1. Initial Toxics Inventory

The Annual Emissions Reporting (AER) software is used to:

- Satisfy the quadrennial (once in four year) reporting requirements of the AB2588 Program, and
- Get an initial inventory of air toxics from facilities new to the AB2588 Program.

Facilities in the AB2588 Program are required to report their toxic emissions to the SCAQMD quadrennially (i.e., once every four years). Up until June 2001, the reporting requirement was implemented through the AB2588 Program, which was separate from reporting of criteria and toxic pollutants under the AER Program. Beginning with the FY 2000-01 reporting cycle, toxics emission reporting for the AB2588 Program was incorporated into the SCAQMD's AER Program.

Under the AER Program, facilities which have the potential to emit: 1) four tons per year (tpy) or more of VOC, NO_X, SO_X, PM, or 100 tpy or more of CO; or 2) any one of 24 toxic air contaminants (TACs) and ozone depleting compounds (ODCs) listed in Table 2, are required to report their emissions annually to the SCAQMD. Facilities subject to the AER Program calculate and report their emissions based on their throughput data (e.g., fuel usage, material usage, etc.), appropriate emission factors, and control efficiency (if applicable). The software used for reporting emissions is available on the SCAQMD website.[3] There are approximately 3,000 facilities in the AER Program.

Table 2. Reported TACs and ODCs under the AER Program.

Ammonia	Chlorinated dioxins & dibenzofurans	Lead
Asbestos	Chlorofluorocarbons	Methylene chloride
Arsenic (inorganic)	1,4-Dioxane	Nickel
Benzene	Ethylene dibromide	Perchloroethylene
Beryllium	Ethylene dichloride	Polynuclear aromatic hydrocarbons (PAH)
1,3-Butadiene	Ethylene oxide	1,1,1-Trichloroethane
Cadmium	Formaldehyde	Trichloroethylene
Carbon tetrachloride	Hexavalent chromium	Vinyl chloride

Currently, the data collected over the years in the AER program is used to determine candidates for the AB2588 Program. Facilities that meet one of the following conditions are required to prepare a comprehensive toxics inventory:

- Emit 10 tons tpy or more of VOC, NO_X, SO_X, or PM;
- Exceed one or more of the emission reporting thresholds in Table 3; or
- Experience persistent nuisance complaints from their neighbors.

Facilities must report emissions of over 170 substances (Appendix A), provide the distances to the nearest residential and commercial receptors, and note the facility operating conditions (e.g.,

operating hrs/day, operating days/week, operating weeks/yr) using the AER software. It is critical that facilities estimate their toxic emissions as precisely and accurately as possible. These reported emissions are used to prioritize the facility as discussed in the next section. A facility's prioritization score determines its fees and if it is necessary to prepare a HRA.

Table 3. Emissions Reporting Thresholds*

Toxic Air Contaminant	Threshold (lbs/yr)	Toxic Air Contaminant	Threshold (lbs/yr)
Ammonia	20,000	Formaldehyde	140
Benzene	29	Hexavalent chromium	0.0056
Beryllium	0.34	Inorganic arsenic	0.05
1,3 Butadiene	4.8	Lead	16
Cadmium	0.19	Methylene chloride	820
Carbon tetrachloride	19	Nickel	3.1
1,4 Dioxane	110	Perchloroethylene	140
Dioxins & Furans	0.00002	1,1,1 Trichloroethane	99,000
Ethylene dibromide	11	Trichloroethylene	410
Ethylene dichloride	40	Vinyl chloride	11

* The emission levels are back-calculated from cancer risks of 25 in one million and/or a hazard index of 3 using the risk assessment procedures for Rule 1401 and 212.

3.2. Prioritization

AB2588 requires the SCAQMD staff to designate high, intermediate, and low priority categories and include each facility within the appropriate category based on its individual priority. Per the requirements of AB2588, the SCAQMD's prioritization procedure considers the potency, toxicity, and quantity of hazardous materials released from the facility; the proximity of the facility to potential receptors, including, but not limited to, hospitals, schools, daycare centers, worksites and residences; and any other factors that the SCAQMD determines that the facility may pose a significant risk to receptors. The SCAQMD procedures also include adjustment factors for exposure period, averaging times, and the treatment of multi-pathway pollutants. The prioritization procedures are available at the SCAQMD's web site.[4]

A facility receives two scores: one for carcinogenic effects and the other for non-carcinogenic effects. The facility is then ranked based on the higher of the two scores. Three categories are used in the ranking: high priority (Category A), intermediate priority (Category B), and low priority (Category C). Facilities designated as high priority are required to submit heath risk assessments to determine the risk to their surrounding community. Facilities ranked as intermediate priority are considered to be "District Tracking" facilities, which are then required to submit complete toxics inventories once every four years, using the AER software. Facilities ranked as low priority are exempt from reporting. Priority scores are re-calculated each time a facility updates its toxic emission inventory. Table 4 summarizes the priority score categories and the actions required by each category.

Table 4. Priority Score Categories.

Category	Facility Priority Score (PS)	Actions
High Priority (Category A)	PS > 10	Prepare HRA; update emissions quadrennially
Intermediate Priority (Category B)	1 < PS ≤ 10	Update emissions quadrennially
Low Priority (Category C)	PS ≤ 1	Exempt from AB2588 Program

The SCAQMD considers requests from Category A facilities to be reprioritized after detection of errors or other problems with their initial inventory report. The following sections discuss the criteria used for evaluating requests to reprioritize a facility.

The facility is informed, in writing, if their category status has been changed. If a facility has not been informed in writing of a change in category, a health risk assessment must be prepared and submitted to the SCAQMD.

3.2.1. Receptor Distance

One of the factors considered when prioritizing facilities into Category A, B or C is the receptor distance. All facilities must report the distances to the nearest residential and industrial receptors as part of their AER submittal. If receptor distances are not provided, then default values (conservative receptor distances) are used by the SCAQMD to prioritize that facility. If a facility operator believes that their facility was incorrectly categorized due to an incorrect or default receptor distance, then the facility must prepare and submit a signed copy of the Receptor Proximity Form which can be downloaded from the website.[2]

3.2.2. Computational Errors

If computational errors or conservative assumptions were made in the initial inventory report that overestimated emissions and resulted in Category A classification, the facility may correct the errors and submit the corrected estimates and supporting documentation to the AB2588 staff. In order to be considered, the facility must include in their submission the nature of the error and calculations showing how the original emission estimate was determined and how the correction changes this value.

Please note that the SCAQMD must use process rates and emissions from the initial reporting year to prioritize a facility. Changes in emissions estimates due to changes in process rates submitted for the update cannot be used to re-categorize a facility.

3.2.3. New Source Test Results

If new source test results are available and have been previously submitted to the SCAQMD, then approved source test results may be used with the process rates in the initial inventory report to recalculate emissions and the priority score of Category A facilities.

3.2.4. Equipment/Process Shutdowns or Process Modifications

If equipment or processes with toxic emissions have been shut down prior to Category A classification and the permits have been surrendered, then these emission reductions may be used to recalculate the priority score of Category A facilities. Evidence for these emission reductions must include copies of letters sent to the SCAQMD requesting emission reduction credits and/or termination of SCAQMD permits.

If a process has been modified since the initial inventory report and no longer emits a toxic substance, and the facility has applied for a permit modification reflecting this change, then the emission reduction for that substance may be used to recalculate the priority score.

All supporting documentation regarding equipment shutdowns and process modifications must be received by the AB2588 Section.

3.2.5. Facility Closures

If the entire facility is closed prior to Category A classification or if a facility is scheduled for complete closure, this information must be reported to the AB2588 Section. Upon review, the SCAQMD will make a decision whether the facility should submit a risk assessment. Factors that must be considered include the status of permits granted to the facility by the SCAQMD and the nature of any ongoing activities at the facility. Unless a facility is informed by the SCAQMD in writing that an AB2588 health risk assessment is no longer required, the facility operator must submit a health risk assessment.

3.2.6. Change of Ownership

If there has been a change in ownership, the new owner/operator must submit a health risk assessment unless the facility no longer emits any substances required to be reported under AB2588.

3.3. Emission Estimates Approved for Health Risk Assessment

Facilities subject to the submittal of health risk assessments under AB2588 Program must estimate and submit their detailed toxic emissions using Hotspots Analysis and Reporting Program (HARP). This detailed Air Toxics Inventory Report (ATIR) should include, at a minimum, the elements outlined in Appendix B. OEHHA has grouped the substances to be reported into three groups as shown in Appendix A of the OEHHA Guidelines.[1] There are distinct reporting requirements for the three groups as follows:

Appendix A-I Substances – All emissions of these substances must be quantified in the HRA including those quantified in the inventory report as below the degree of accuracy or below detection limits.

Appendix A-II Substances – Emissions of these substances do not need to be quantified in the HRA; however, facilities must report whether the substance is used, produced, or otherwise present on-site. These substances can be simply listed in a table in the HRA.

Appendix A-III Substances – These substances only need to be reported in a table in the HRA if they are manufactured by the facility.

The intent of the AB2588 program is that facilities perform risk assessments using the process rates and emissions data submitted in their initial inventory report (see Section 3.1). The SCAQMD receives requests from facilities to use process rates and emissions data other than those reported in their initial inventory report. As a general policy, the SCAQMD will allow emission changes only if (1) the changes conform to one of the situations discussed in the following sections and (2) any emission increases are also included.

3.3.1. Computational Errors

Computational errors in the air toxics inventory report must be reported to the SCAQMD as soon as detected. Written requests to correct errors for inclusion in the risk assessment must include documentation of the nature of the error and calculations to show how the original emission value was determined and how correcting the computational error changes this value.

3.3.2. Emission Reductions

Emissions reductions must be verified to be considered as an allowable change. Verified emission reductions are those which are **permanent, can be substantiated, and must be enforceable**. Verification requirements include specifications in the SCAQMD permit issued to the facility, a surrender of the existing SCAQMD permit, or reductions as required by SCAQMD rule(s). Letters of intent or internal memos mandating new company policy are not considered verifiable emission reductions.

Examples of verifiable emission reductions include:

- A previously operating permitted source has been shut down and therefore has no emissions. In order for this to be considered as a verified emissions reduction, the facility must have surrendered the permit to the SCAQMD. If a facility chooses to retain the permit for possible use of the equipment in the future, that source cannot be considered a permanent verified emissions reduction. Please send a copy of the letter requesting inactivation of the permit and any other supporting documentation to the AB2588 Section of Planning.
- A listed substance is no longer used and therefore not emitted in a process at the facility. The permit conditions have previously been modified to reflect this change. A copy of the modified permit or, if not yet available, a copy of the 400A application form requesting a change of permit conditions and a copy of the check for filing fee submitted to the SCAQMD must be sent to the AB2588 Section.
- Pollution control equipment which has been issued a permit-to-construct, has been installed, and is now in operation. Provide a copy of the permit-to-construct (and permit-to-operate, if issued), and show calculations for emission reductions. Provide the references for any emission factors used in the calculations. If source testing data was used to calculate the emissions, provide a copy of the source test protocol and all documentation relating to the results.
- Requirements of new SCAQMD rules have resulted in permanent and enforceable reductions. Provide documentation on how reductions are or will be achieved by a specified date.

If the facility wishes to use verified emission reductions in their risk assessment, documentation of these **verified** changes must be provided. Note that new emissions or emission increases, due

to process changes or new equipment, must also be quantified and included in any risk assessment which incorporates emission reductions since the initial inventory was prepared.

3.3.3. Modifications in Progress

Any modifications to reduce risk must be in place and verifiable in order to be considered in calculating allowable emissions reductions. Documentation of the reductions must be submitted to the SCAQMD along with the health risk assessment. Examples of such modifications include the following:

- A permit to construct has been granted for control equipment but the equipment is not yet in place and/or a permit to operate has not been issued. In order to be considered, a copy of the permit and a letter indicating intent to construct must be provided to the AB2588 Section.
- A listed substance will be replaced or substituted. The facility must apply for a change in permit conditions and have the change in place. A copy of the 400A application form submitted requesting a change of permit conditions and a copy of the check for the filing fee must also be sent to the AB2588 Section.

For these "reductions in progress", the facility should contact the AB2588 Section to obtain approval and determine if the intended changes can be considered as verifiable emission reductions. Upon approval, the facility must estimate cancer risk, cancer burden, and hazard indices for both the initial emissions and for the estimated emissions after the proposed future reductions are complete. The two risk estimates must be presented separately in the HRA submitted to the SCAQMD. The dual estimate provides a "back up" in case reductions proposed by the facility are not implemented as planned.

3.3.4. New Source Testing Data

Data from new or yet to be completed source tests will not be approved for use in the preparation of the required risk assessment. However, if a facility has already conducted and completed the source test with an SCAQMD-approved source test protocol, and all supporting documentation is provided to the AB2588 Section, it may be considered for approval. The SCAQMD will notify the facility in writing if new source test results are approved for use in the AB2588 HRA. Otherwise, the facility cannot use the new source testing data. Please call the AB2588 section if you submit a request and have not been notified regarding approval before submitting the HRA.

If a facility wishes to provide unapproved source test data for informational purposes only, it must be presented in an alternate HRA (i.e., as an appendix to the HRA). The alternate HRA must be presented with separate findings and discussion of cancer risk and hazard indices. Failure to completely separate the alternate HRA from the required analysis is grounds for rejection of the HRA.

3.3.5. Diesel Particulate Matter Emissions

Diesel particulate matter emissions were identified as a toxic air contaminant (TAC) by California Air Resources Board (CARB) in 1998, and were added to SCAQMD Rule 1401 list of compounds on March 7, 2008. Under the current AB2588 Air Toxics "Hot Spots" Emission Inventory Criteria and Guidelines Regulation, amended on August 27, 2007, you are required to include health risk impacts of any diesel exhaust particulate emissions from stationary emergency and prime compression ignition internal combustion engines, as well as portable diesel engines. **Please clearly identify emergency diesel internal combustion engines (DICEs) and their corresponding emissions.** This is essential because, on January 5, 2007, the SCAQMD Board adopted separate public notification procedures for emergency DICEs.

3.4. Uncertainty Analyses and Alternative Health Risk Assessments

The OEHHA guidelines describe uncertainty analyses (or risk assessments with alternate assumptions) that may be provided at the discretion of the SCAQMD. The SCAQMD will allow such analyses to be included as one of the appendices to the facility's risk assessment document. This analysis would be a supplement to the primary risk assessment that is carried out using the assumptions presented in the OEHHA guidelines and the guidance given here. Deviations from the OEHHA Tier-1 point estimate methodology must be described in detail at the beginning of the appendix and the reasons for the alternative assumptions must also be described in detail with supporting documentation.

All analyses and discussion relating to an alternative analysis must appear under a separate title such as "Alternative Analysis" in an appendix to the risk assessment document. If an alternative risk analysis is mixed together with the Tier-1 analysis and not presented in a separate appendix of the document as required by OEHHA and SCAQMD guidelines, the risk assessment document will be considered unacceptable and returned to the facility owner/operator for revision.

3.5. Reporting Format

The reporting format for the HRA must follow the detailed outline presented in Appendix C. A completed Health Risk Assessment Summary must be included in the executive summary of all health risk assessments submitted to the SCAQMD; a sample of the form can be downloaded from the SCAQMD's AB2588 website.[2] The detailed HRA outline provided in Appendix C lists the HARP computer files to be included in a CD with the HRA. Three (3) copies of the HRA and three (3) copies of CD(s) should be sent to SCAQMD staff involved in the facility HRA. The HRA, in electronic form (i.e., pdf format), should also be included on the CD.

Cancer risk values should be reported to the nearest tenth and should be rounded up from 5 (e.g., 5.05 in a million is rounded up to 5.1 in a million). Non-cancer risk values should be reported to the nearest hundredth and should be rounded up from 5 (e.g., a hazard index of 0.105 is rounded to 0.11)

3.6. Notification and Risk Reduction Levels

The SCAQMD Governing Board has adopted risk levels for purposes of notification pursuant to the AB2588 program. In addition, SCAQMD Rule 1402 establishes levels that require risk reduction; the levels are summarized in Table 5. Additional information regarding the SCAQMD's notification procedures are available on the web site.[5]

Table 5. Public Notification and Risk Reduction Levels.

Risk Variable	Public Notification Levels	Risk Reduction Levels
Cancer risk	≥ 10 in a million	≥ 25 in a million
Non-cancer risk	Hazard index > 1	Hazard index ≥ 3
Cancer burden	--	≥ 0.5 excess cancer cases

3.7. Maximum Exposed Individual

To identify the location of the maximum exposed individual, it is necessary to examine current land use and allowable land use in the vicinity of the point of maximum impact (residential, commercial/industrial or mixed use). The use of block group or census tract centroids as surrogates for the maximum exposed individual does not provide sufficient spatial resolution and will not be approved.

Cancer risk and non-cancer chronic hazard indices (HIs) must be provided for both the most exposed residential and the most exposed commercial/industrial receptors. The non-cancer acute HI must be provided for the PMI, that is the offsite point of maximum impact. Additionally, cancer risk and hazard index values at each sensitive receptor located within the zone of impact must be presented in a table. The zone of impact is discussed in the next section.

3.8. Zone of Impact

In any risk assessment, it is necessary to define a zone of impact or a method to set boundaries on the analysis. For AB2588 purposes, the SCAQMD requires that the risk assessment must encompass the area subject to an added lifetime cancer risk (all pathways) of one in one million or greater ($\geq 1.0 \times 10^{-6}$). For non-carcinogens the analysis must bound the area subject to a hazard index of greater than or equal to one half (≥ 0.5).

3.9. Land Use Considerations

Risk estimates are sensitive to land uses (e.g. residential, commercial, vacant) since these factors can affect exposure assumptions. If residential or worker risks are not calculated at the point of maximum impact because the land is currently vacant, the location, zoning and potential future land uses must be discussed. Updated information on current land uses is requested when updated emission estimates are reported to the SCAQMD.

3.10. Maps

Maps showing the location of the source in relation to the zone of impact must be submitted. Dispersion modeling for sources should be conducted with receptors defined in terms of Universal Transverse Mercator (UTM) coordinates. For carcinogen impacts, total risk isopleths for facilities should be plotted on the street map provided through HARP at cancer risk intervals of 1, 10, 25, and 100 in a million. Isopleths for non-carcinogens must include levels corresponding to a HI of 0.5, 1, 3, and 5.

Separate maps should be provided for each of the three risk variables: cancer risks, non-cancer acute risks, and non-cancer chronic risks. The maps must contain an accurate scale for measuring distances and a legend. The map scale that can accommodate the isopleths and show the greatest level of detail must be used. The names of streets and other locations must be presented and be legible.

The location of schools, hospitals, day-care centers, other sensitive receptors, residential areas and work-sites within the zone of impact must be identified on the map. If the area of the zone of impact is very large, then more detail should be devoted to higher concentration/risk areas versus lower risk areas. The land uses in the vicinity of the point of maximum impact (off-site) must be shown in detail. This may require a separate map. If sensitive receptors are located within the zone of impact, then risk and hazard index values must also be presented in the form of a table including all the sensitive receptors.

3.11. Air Dispersion Modeling

Air dispersion modeling is performed for the exposure assessment of the health risk assessment. A basic understanding of dispersion modeling is presumed. For a more detailed overview of regulatory modeling procedures, the reader is referred to the U.S. Environmental Protection Agency's "Guideline on Air Quality Models."[6]

3.11.1. Facility Description and Source Information

The HRA report should contain a brief description of the facility and its activities as shown in the detailed HRA report outline provided in Appendix C. Table 6 lists the information on the facility and its surroundings that must be provided in the modeling analysis. The facility location is used to determine the most representative meteorological data for the analysis. The nearby land use is needed to properly label receptors as residential, commercial, sensitive, etc.

The facility plot plan (including a length scale) is needed to determine all source locations including their elevations above sea level, building dimensions, and the property boundary. The operating schedule, the hourly emission rates, the annual average emission rates, and the source parameters listed in Table 6 are necessary to accurately characterize the source emissions. The reader is referred to the detailed outline provided in Appendix C for additional information and guidance.

Table 6. Required Source Information.

Information on the Facility and Its Surroundings

- Location (i.e., address and UTM coordinates)
- Local land use (within 20 km)
- Local topography (within 20 km)
- Facility plot plan
  - Property boundaries
  - Horizontal scale
  - Building heights (for building downwash calculations)
  - Source locations including elevations

Point Source Information (stacks, vents, etc.)

- Maximum and average hourly emission rates
- Annual emissions
- Stack location (in UTM coordinates) on plot plan including elevation
- Stack height
- Stack gas exit velocity
- Stack gas exit temperature
- Building dimensions, heights, and location

Fugitive Source Information (area and volume sources)

- Maximum and average hourly emission rates
- Annual emissions
- Source location (in UTM coordinates) on plot plan including elevations
- Source height
- Area or volume dimensions

3.11.2. Model Selection and Model Options

All AB2588 risk assessments prepared for the SCAQMD must use the Hotspots Analysis and Reporting Program (or HARP).[7] The U.S. Environmental Protection Agency (U.S. EPA) air quality dispersion model, called ISCST3 (Industrial Source Complex – Short Term, Version 3) is used by HARP for the exposure assessment. ISCST3 is a Gaussian plume model capable of estimating pollutant concentrations from a wide variety of sources that are typically present in an industrial source complex. Emission sources are categorized into four basic types: point, area, volume, and open pit sources. ISCST3 estimates hourly concentrations for each source/receptor pair and calculates concentrations for user-specified averaging times, including an average concentration for the complete simulation period. ISCST3 includes atmospheric dispersion options for both urban and rural environments and can address flat, gently rolling, and complex terrain situations. ISCST3 documentation is available at the U.S. EPA website.[8] Table 7 summarizes the dispersion modeling assumptions required by the SCAQMD. These requirements are discussed in more detail next.

It is also acceptable to use AERMOD and CARB's HARP On-Ramp to import AERMOD output into HARP's Risk Module. AERMOD-ready meteorological data are available on the SCAQMD website.

Table 7. Summary of SCAQMD Dispersion Modeling Guidance.

Parameter	Assumption
Model Control Options	
Use regulatory default?	No
Urban or Rural?	Urban
Gradual plume rise?	No
Stack tip downwash?	Yes
Buoyancy induced dispersion?	Yes
Calms processing?	No
Missing data processing?	No
Source Options	
Include building downwash?	Yes
Lowbound option?	No
Meteorology Options	
Meteorological data	See note #1 below

1. See section 3.11.3 for additional discussion. The data are available for download from the SCAQMD website; see reference [9].

ISCST3 should be executed using the urban dispersion parameters (i.e., URBAN), which is SCAQMD policy for all air quality impact analyses in its jurisdiction. The U.S. EPA regulatory defaults options are implemented except that the calm processing option is disabled (i.e., NOCALM). The SCAQMD believes that calm processing is inappropriate for its meteorological data for the following reasons:

- Calm processing was developed by the U.S. EPA to correct problems with preprocessed data in which calm winds are given the speed of 1 m/s and the direction of the last non-calm hour. This results in artificial persistence. Wind data collected by the SCAQMD is not preprocessed.
- Wind speeds in the SCAQMD stations are always 1 m/s or greater. Thus, model problems associated with lower wind speeds are not an issue.
- Wind direction is always recorded regardless of the wind speed and the direction is randomized over a 22.5 degree sector. Thus, artificial persistence is not an issue.
- AQMD data is more like on-site data and calm processing is not appropriate for on-site data.
- Given the high frequency of calms at many sites in the South Coast Air Basin and their association with high pollutant concentrations, it would be inappropriate to eliminate that portion of the data.

For these reasons, the SCAQMD does not require calm processing for dispersion modeling that uses SCAQMD supplied meteorological data.

3.11.3. Meteorological Data

The SCAQMD has 1981 meteorological data (i.e., hourly winds, atmospheric stability, and mixing heights) at 35 stations in the South Coast Air Basin, as shown in Figure 2 and listed in Table 8.

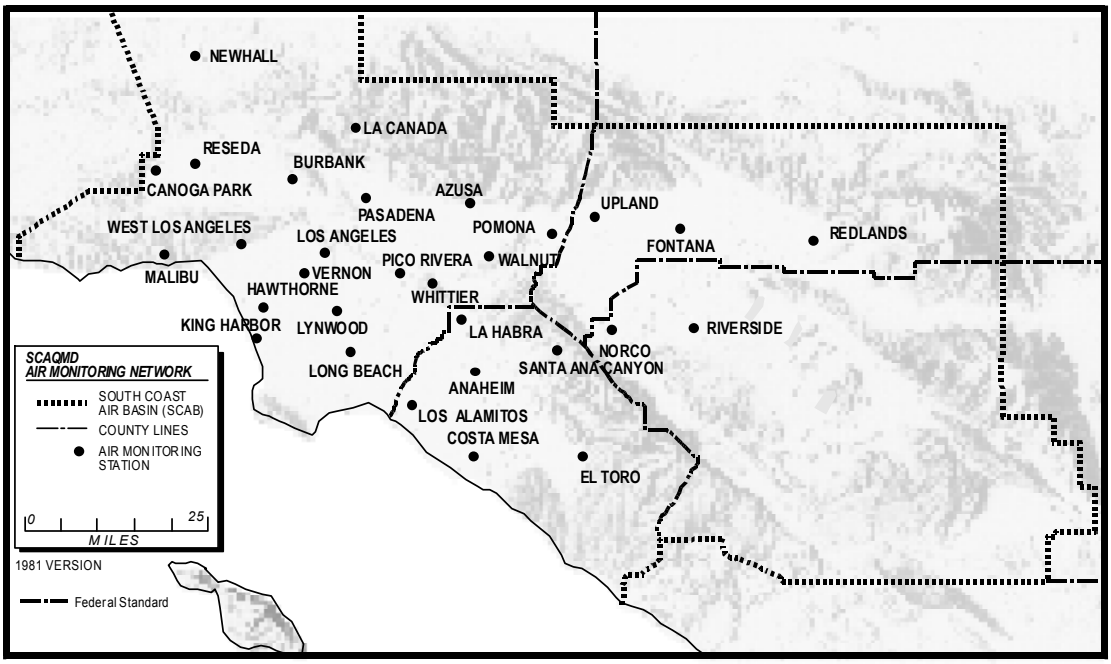

Figure 2. Locations of meteorological stations.

This data is in a format which can be directly read by U.S. EPA's dispersion model, ISCST3 and by ARB's health risk assessment tool, HARP. The nearest representative meteorological station should be chosen for modeling. Usually this is simply the nearest station; however, an intervening terrain feature may dictate the use of an alternate station. Modelers should contact the AB2588 Section regarding the most representative meteorological station if necessary. The data are available on the following SCAQMD website.[9]

Table 8. Locations of Meteorological Stations

Station name	UTM Coordinates (m)		Lat./Long. Coordinates	
	E-W	N-S	Latitude	Longitude
Anaheim	415.0	3742.5	33°49'16"	117°55'07"
Azusa	414.9	3777.4	34°08'09"	117°55'23"
Banning	510.5	3754.5	33°55'58"	116°53'11"
Burbank	379.5	3783.0	34°10'58"	118°18'27"
Canoga Park	352.9	3786.0	34°12'23"	118°35'48"
Compton	385.5	3750.3	33°53'19"	118°14'17"
Costa Mesa	413.8	3724.2	33°39'21"	117°55'47"
Downtown Los Angeles	386.9	3770.1	34°04'02"	118°13'31"
El Toro	436.0	3720.9	33°37'39"	117°41'25"
Fontana	455.4	3773.9	34°06'24"	117°29'01"
Indio	572.3	3731.0	33°43'06"	116°13'11"
King Harbor	371.2	3744.4	33°50'00"	118°23'30"
La Canada	388.2	3786.1	34°12'42"	118°12'49"
La Habra	412.0	3754.0	33°55'28"	117°57'07"
Lancaster	396.0	3839.5	34°41'38"	118°08'08"
Lennox	373.0	3755.0	33°55'46"	118°22'26"
Long Beach	390.0	3743.0	33°49'24"	118°11'19"
Los Alamitos	404.5	3739.8	33°47'45"	118°01'54"
Lynwood	388.0	3754.0	33°55'20"	118°12'42"
Malibu	344.0	3766.9	34°01'59"	118°41'23"
Newhall	355.5	3805.5	34°22'59"	118°31'02"
Norco	446.8	3749.0	33°52'54"	117°34'31"
Palm Springs	542.5	3742.5	33°49'25"	116°32'27"
Pasadena	396.0	3778.5	34°08'38"	118°07'41"
Pico Rivera	402.3	3764.1	34°00'53"	118°03'29"
Pomona	430.8	3769.6	34°03'60"	117°44'60"
Redlands	486.2	3769.4	34°04'00"	117°09'00"
Reseda	359.0	3785.0	34°11'54"	118°31'49"
Riverside	464.8	3758.6	33°58'10"	117°22'50"
Santa Ana Canyon	431.0	3748.4	33°52'32"	117°44'46"
Upland	440.0	3773.1	34°05'55"	117°39'02"
Vernon	387.4	3762.5	33°59'55"	118°13'10"
Walnut	420.0	3761.7	33°59'41"	117°51'58"
West Los Angeles	372.3	3768.6	34°03'08"	118°23'01"
Whittier	405.3	3754.0	33°55'26"	118°01'28"

3.11.4. Receptor Grid

Air dispersion modeling is required to estimate (a) annual average concentrations to calculate the Maximum Individual Cancer Risk (MICR), the maximum chronic HI, the zones of impact, and excess cancer burden and (b) peak hourly concentrations to calculate the health impact from substances with acute non-cancer health effects. To achieve these goals, the receptor grid should begin at the facility fence line and extend to cover the zone of impact. In addition, the receptor grid should be fine enough to identify the points of maximum impact.

To identify the maximum impacted receptors (i.e., peak cancer risk and peak hazard indices) a grid spacing of 100 meters or less must be used. All receptors should be identified in UTM coordinates. Receptor grid points outside of the facility boundary with grid spacing of 100 meters or more must be placed so that individual grid points are placed at UTM coordinates ending in "00" (e.g., grid point UTM East 572300 and UTM North 3731000). Receptor grids with less than 100 meter spacing must include grid points at UTM coordinates ending in "00".

Receptors on the facility boundary must be placed along the boundary following the maximum spacing requirements shown in Table 9. Sensitive receptors must be identified by exact UTM coordinates. Elevations must be provided for all receptors.

Table 9. Maximum Receptor Spacing Requirements for Fenceline Receptors.

Area of Facility	Maximum Receptor Spacing
Area < 4 acres	20 meters
4 acres ≤ Area < 10 acres	30 meters
10 acres ≤ Area < 25 acres	50 meters
25 acres ≤ Area < 100 acres	75 meters
Area ≥ 100 acres	100 meters

3.11.5. Stacks with Raincaps and Area Sources

Emission release points with raincaps or which are oriented so that the exhaust is vented downward or horizontally may not use the velocity inside the stack as the vertical velocity of the point source in the model. However, as a point source must be modeled with some vertical velocity, these stacks may be modeled with a positive vertical velocity of no more than 0.1 meters per second. In general, if there is uncertainty on how to represent sources in a model, SCAQMD staff in the AB2588 Section should be consulted before proceeding with modeling.

According to U.S. EPA guidance for area sources in ISCST3, the aspect ratio (i.e., length/width for area sources should be less than 10 to 1. If this is exceeded, then the area should be subdivided to achieve a 10 to 1 or less aspect ratio for all sub-areas.

3.12. Risk Assessment

The SCAQMD requires that all AB 2588 HRAs be prepared in accordance with OEHHA and ARB guidance[1] and using the ARB computer program: HotSpots Analysis and Reporting Program (HARP).[7] OEHHA guidance requires at least a Tier-1 evaluation, which allows for Derived Risk Calculations. ARB guidance (with OEHHA concurrence) allows for a Derived **Adjusted** Residential Cancer Risk Calculation. ARB prepared HARP to facilitate the preparation and transmittal of a compliant ATIR and HRA. The details are provided below.

3.12.1. OEHHA Guidance

OEHHA guidance is contained in the Air Toxics Hot Spots Program Risk Assessment Guidelines (RAGs): The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA August 2003).[7] This guidance manual has "passed" public

and peer review, endorsed by the California Scientific Review Panel (SRP), and adopted by OEHHA. The guidance manual is available from the web.[7]

OEHHA Guidance recognizes four types of evaluations.

Tier-1: point estimate, using standard assumptions

Tier-2: point estimate, using site-specific details

Tier-3: stochastic risk, using standard assumptions

Tier-4: stochastic risk, using site-specific details

The details are described in the Guidance Manual.

"Tier-1 is a standard point-estimate approach using the recommended point-estimates presented in this document. […] Tier-1 evaluations **are required** for all HRAs prepared for the Hot Spots Program." (see Section 2.5.3. of reference [1]; boldface added)

"[T]he Tier-1 evaluation is useful in comparing risks among a large number of facilities and **must** be included in all HRAs." (see Section 8.2.5.C. of reference [1]; boldface added)

As such, the SCAQMD requires that all AB 2588 HRAs contain at least a Tier-1 evaluation. The results of the Tier-1 evaluation are used for comparative and regulatory purposes (i.e., risk status, fee category, public notice, and risk reduction).

The Executive Summary and main body of the HRA shall contain only statements regarding the results of the Tier-1 evaluation. Tier-2, Tier-3, and Tier-4 evaluations may be prepared and presented as an appendix to the main document. The results of the Tiers 2-4 evaluations should not be in the Executive Summary and main document. Site specific details for either a Tier-2 or Tier-4 evaluation may require review and approval by OEHHA, ARB, or SCAQMD.

In accord with these guidelines, OEHHA and SCAQMD will allow Derived Risk Calculations to be prepared and presented in an AB2588 HRA. Derived Risk Calculations have "the two dominant (driving) exposure pathways use the high-end point-estimates of exposure, while the remaining exposure pathways use average point estimates."[10]

3.12.2. ARB Guidance

On October 9, 2003 , ARB issued an Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk. This management policy has been adopted by ARB, in consultation and accord with OEHHA. The policy is available from the web.[11]

In accord with this policy, CARB, OEHHA, and SCAQMD will allow a Derived **Adjusted** Residential Cancer Risk Calculation to be prepared for and presented in an AB2588 HRA. Derived **Adjusted** Risk Calculations have "the breathing rate at the 80th percentile of exposure rather than the high-end point-estimate when the inhalation pathway is one of the dominant exposure pathways."[12]

The worker risk calculations remain unaffected and unadjusted.

3.12.3. HARP

To facilitate the preparation and submittal of ATIRs and HRAs, CARB prepared and distributes the HARP for **free**. The program and documentation are available from the web.[7]

HARP is "designed to meet the programmatic requirements of the Hot Spots Program." (page 10-1 of reference 7). HARP will calculate all four Tiers and both the Derived Risk Calculations (as designed by OEHHA) and Derived **Adjusted** Residential Cancer Risk Calculations (as prescribed by ARB).

The outline for an HRA is contained in Appendix C. The list of important files is contained in the HARP User's Guide (Section 10.1.3. Keeping a Record of Risk Assessment Results, Page 10-3). Any emissions factor development, emission rates calculations, or approved source test protocol and reports must be submitted along with the facility CD. If these items have been attached to Annual Emissions Report (AER), you may refer to it in the cover letter and avoid a redundant submittal.

3.12.4. SCAQMD Guidance

All HRAs prepared for the SCAQMD must include a Tier-1 evaluation. All SCAQMD risk management decisions are based on the Tier-1 risk assessment. Tier-2, Tier-3, and Tier-4 evaluations may be prepared but must be included in an appendix of the HRA. The results of the Tier-2, Tier-3, and/or Tier-4 evaluations must not be included in the Executive Summary or main body of the HRA. Table 10 summarizes the risk assumptions required by the SCAQMD. These requirements are discussed in more detail next.

Residential cancer risks assume a 70-year exposure and must include, at a minimum, the following pathways: home grown produce, dermal absorption, soil ingestion, and mother's milk. A deposition velocity of 0.02 m/s should be assumed for the non-inhalation pathways. The HRA should assume the urban default value of 5.2 percent for the fraction of homegrown fruits and vegetables consumed. The other pathways of fish ingestion; dairy milk ingestion; drinking water consumption; and meat (i.e., beef, pork, chicken, and egg) ingestion should be included only if the facility impacts a local fishable body of water, grazing land, dairy, or water reservoir. The "Derived (Adjusted)" risk calculation method should be used for estimating cancer risks at residential receptors. To estimate chronic non-cancer risks at residential receptors the "Derived (OEHHA)" risk calculation method should be used.

Table 10. Summary of SCAQMD Health Risk Assessment Guidance.

Parameter	Assumption
Pathway	
Drinking water	Site specific; see note #1 below
Fish water	Site specific; see note #1 below
Beef/dairy (pasture)	Site specific; see note #1 below
Home grown produce	Required for residential receptors
Pigs, chickens, and/or eggs	Site specific; see note #1 below
Dermal	Required for residential & worker receptors
Soil ingestion	Required for residential & worker receptors
Mother's milk	Required for residential receptors
Deposition velocity	0.02 meters per second
Fraction of homegrown fruits & vegetables consumed	5.2 percent
Cancer Risk Assumptions or Methods for Residential Receptors	
Exposure duration	70 years
Analysis method	Derived (Adjusted)
Cancer Risk Assumptions or Methods for Worker Receptors	
Exposure duration	40 years; see note #2 below
Analysis method	Point estimate
Chronic Non-cancer Risk Assumptions or Methods for Residential Receptors	
Analysis method	Derived (OEHHA)
Chronic Non-cancer Risk Assumptions or Methods for Worker Receptors	
Analysis method	Point estimate; see note #3 below

1. Required pathway only if the facility impacts a local fishable body of water, grazing land, dairy, or water reservoir.
2. See text discussion and Table 11 for required concentration adjustments.
3. The concentration adjustments provided in Table 11 are not necessary for non-cancer chronic risks.

Worker cancer risks assume a 40-year exposure and must include the pathways of dermal absorption and soil ingestion. A deposition velocity of 0.02 m/s should be assumed for these pathways. The "Point estimate" risk calculation method should be used for estimating cancer and non-cancer chronic risks at worker receptors.

The air concentration that the neighboring workers breathe when present at work is different than the annual average concentration calculated by the dispersion model, ISCST3. The annual average estimated by the dispersion model is a 24 hours per day, 7 days per week, 365 days per year average, regardless of the actual operating schedule of the emitting facility. It is assumed the off-site worker is impacted by the toxic emissions only during work hours and the worker's 8-hour breathing rate is 149 liters per kilogram of body weight per day. Thus, the model-predicted concentrations must be adjusted by a multiplying factor to reflect the pollutant concentration that the worker breathes. For example, suppose that the off-site worker and the emitting facility have the same operating schedule, perhaps 8 hours per day, 5 days per week,

and 52 weeks per year. The annual average concentrations predicted by ISCST3 must be adjusted by a factor of 4.2 (i.e., 7/5 x 24/8). The reader is referred to the OEHHA guidelines on pages 8-5 and 8-6 for further detail on this issue.[1]

The adjustment factors for all possible operating schedules are given in Table 11. These factors are entered into HARP by activating the worker scenario labeled "User adjusted GLC or exposure assumptions" and entering the appropriate factor in Table 11 in the data field labeled "GLC adjustment factor." If the emitting facility operates continuously then the user should activate the worker scenario labeled "Use modeled GLC and default exposure assumptions."

The adjustments in Table 11 should only be applied when estimating worker cancer risks. The adjustments are not applicable to residential cancer risks and to residential and worker chronic non-cancer risks.

Table 11. Adjustment Factors for Off-site Worker Ground-level Concentrations.*

Hours of Operation per Day	Days of Operation per Week		
	1 to 5	6	7
1 to 8	4.2	3.5	3.0
9	3.7	3.1	2.7
10	3.4	2.8	2.4
11	3.1	2.5	2.2
12	2.8	2.3	2.0
13	2.6	2.2	1.8
14	2.4	2.0	1.7
15	2.2	1.9	1.6
16	2.1	1.8	1.5
17	2.0	1.6	1.4
18	1.9	1.6	1.3
19	1.8	1.5	1.3
20	1.7	1.4	1.2
21	1.6	1.3	1.1
22	1.5	1.3	1.1
23	1.5	1.2	1.0
24	1.4	1.2	1.0

* These adjustment factors should only be used when calculating worker cancer risks. The adjustment factors should not be used when calculating chronic non-cancer risks.

4. REFERENCES

[1] OEHHA. 2003. "The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments." The document can be downloaded at the following link: http://www.oehha.ca.gov/air/hot_spots/HRAguidefinal.html

[2] Forms mentioned here can be downloaded from SCAQMD's web site at the following link: http://www.aqmd.gov/prdas/AB2588/AB2588_forms.html

[3] AER software and documentation are at the following link: http://www.aqmd.gov/aer/aer.html

[4] AQMD's prioritization procedures can be downloaded at the following link: http://www.aqmd.gov/prdas/AB2588/AB2588_B2.html

[5] AQMD's notification procedures can be downloaded at the following link: http://www.aqmd.gov/prdas/AB2588/AB2588_B4.html

[6] U.S. EPA. 2003. Guideline on Air Quality Models, Appendix W of 40CFR Part 51. The document can be downloaded at the following link: http://www.epa.gov/ttn/scram/guidance/guide/appw_98.pdf

[7] ARB. 2003. HARP User Guide. The program and document can be downloaded at the following link: http://www.arb.ca.gov/toxics/harp/harp.htm

[8] U.S. EPA. 1995. User's Guide for the Industrial Source Complex (ISC3) Dispersion Models. EPA-454/B-95-003a & EPA-454/B-95-003b. The program and documentation can be downloaded at the following links: http://www.epa.gov/ttn/scram/userg/regmod/isc3v1.pdf http://www.epa.gov/ttn/scram/userg/regmod/isc3v2.pdf

[9] Meteorological data for ISC3 and HARP can be downloaded at the following link: http://www.aqmd.gov/smog/metdata/MeteorologicalData.html

[10] An explanation of the "Derived (OEHHA)" cancer risk method is provided at the ARB web site under frequently asked questions; refer to the following link: http://www.arb.ca.gov/toxics/harp/rmpolicyfaq.htm#10

[11] ARB. 2003. Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk. Letter dated 10/9/2003. The document can be downloaded at the following link: http://www.arb.ca.gov/toxics/harp/docs/rmpolicy.pdf

[12] An explanation of the "Derived (Adjusted)" cancer risk method is provided at the ARB web site under frequently asked questions; refer to the following link: http://www.arb.ca.gov/toxics/harp/rmpolicyfaq.htm#11

Appendix A
AB2588 List of Toxics

Table A-1 contains the list of compounds to be reported by AB2588 facilities preparing their quadrennial emissions inventory under the AER Program. The table provides the compound name, its TAC code and CAS number, and the degree of accuracy for each toxic. The table is alphabetically sorted by name. Multiple compounds within a TAC code group are listed in alphabetical order and shown in italics. The degree of accuracy is nothing more than a de minimis emission level for reporting. As a result, facility-wide emissions of toxics greater than one-half of their corresponding degree of accuracy must be inventoried and reported. Conversely, total facility toxic emissions less than one-half of the degree of accuracy do not need to be reported for TAC Codes 24 through 73.

Table A-1 lists the family name and the individual species within the family for the following toxic air contaminants (TACs):

- Chlorinated dioxins and dibenzofurans (TAC code #7)
- Fluorocarbons (chlorinated) (TAC code #22)
- Glycol ethers and their acetates (TAC code #41)
- Hexachlorocyclohexanes (TAC code #43)
- Isocyanates and diisocyanates (TAC code #48)
- Mercury and mercury compounds (TAC code #50)
- PAHs (TAC code #19)
- Phosphorous compounds (TAC code #60)
- POMS and PAH-derivatives (TAC code #61)
- Selenium and compounds (TAC code #64)
- Sulfuric acid and oleum (TAC code #67)
- Xylenes (TAC code #70)

Table A-1. DeMinimis Reporting Limits for Toxics.

TAC Code	CAS Number	Substance	Degree of Accuracy (lbs/yr)
29	75070	Acetaldehyde	20
30	107028	Acrolein	0.05
31	107131	Acrylonitrile	0.1
32	7664417	Ammonia	200
14	7440382	Arsenic and Compounds (inorganic)	0.01
1	1332214	Asbestos	0.0001
2	71432	Benzene	2
3	7440417	Beryllium	0.001
4	106990	Butadiene [1,3]	0.1
5	7440439	Cadmium	0.01
6	56235	Carbon tetrachloride	1
33	463581	Carbonyl sulfide	100
34	7782505	Chlorine	0.5
35	67663	Chloroform	10
13	18540299	Chromium, hexavalent (and compounds)	0.0001
36	7440508	Copper	0.1
37	7631869	Crystalline silica	0.1
38	117817	Di(2-ethylhexyl) phthalate {DEHP}	20
7	1080	Chlorinated dioxins and dibenzofurans	0.000001
	67562394	*1,2,3,4,6,7,8-Heptachlorodibenzofuran [POM]*	0.000001
	55673897	*1,2,3,4,7,8,9-Heptachlorodibenzofuran [POM]*	0.000001
	35822469	*1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin [POM]*	0.000001
	70648269	*1,2,3,4,7,8-Hexachlorodibenzofuran [POM]*	0.000001
	57117449	*1,2,3,6,7,8-Hexachlorodibenzofuran [POM]*	0.000001
	72918219	*1,2,3,7,8,9-Hexachlorodibenzofuran [POM]*	0.000001
	60851345	*2,3,4,6,7,8-Hexachlorodibenzofuran [POM]*	0.000001
	39227286	*1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin [POM]*	0.000001
	57653857	*1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [POM]*	0.000001
	19408743	*1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [POM]*	0.000001
	39001020	*1,2,3,4,5,6,7,8-Octachlorodibenzofuran [POM]*	0.000001
	3268879	*1,2,3,4,5,6,7,8-Octachlorodibenzo-p-dioxin [POM]*	0.000001
	57117416	*1,2,3,7,8-Pentachlorodibenzofuran [POM]*	0.000001
	57117314	*2,3,4,7,8-Pentachlorodibenzofuran [POM]*	0.000001
	40321764	*1,2,3,7,8-Pentachlorodibenzo-p-dioxin [POM]*	0.000001
	51207319	*2,3,7,8-Tetrachlorodibenzofuran [POM]*	0.000001
	1746016	*2,3,7,8-Tetrachlorodibenzo-p-dioxin {TCDD} [POM]*	0.000001
27	78875	1,2-Dichloropropane {Propylene dichloride}	20
28	542756	1,3-Dichloropropene	10
72	9901	Diesel exhaust particulates	0.1
39	131113	Dimethyl phthalate	50
8	123911	1,4-Dioxane	5
40	100414	Ethyl benzene	200
9	106934	Ethylene dibromide {1,2-Dibromoethane}	0.5
10	107062	Ethylene dichloride {1,2-Dichloroethane}	2
11	75218	Ethylene oxide	0.5

(continued)

Table A-1. (continued)

TAC Code	CAS Number	Substance	Degree of Accuracy (lbs/yr)
22	1104	Fluorocarbons (chlorinated)	1
	76131	*Trichlorotrifluoroethane {CFC-113}*	1
	75434	*Dichlorofluoromethane {Freon 21}*	1
	75694	*Trichlorofluoromethane {Freon 11}*	1
12	50000	Formaldehyde	5
41	1115	Glycol ethers and their acetates	100
	111466	*Diethylene glycol*	100
	111966	*Diethylene glycol dimethyl ether*	100
	112345	*Diethylene glycol monobutyl ether*	100
	111900	*Diethylene glycol monoethyl ether*	100
	111773	*Diethylene glycol monomethyl ether*	100
	25265718	*Dipropylene glycol*	100
	34590948	*Dipropylene glycol monomethyl ether*	100
	629141	*Ethylene glycol diethyl ether*	100
	110714	*Ethylene glycol dimethyl ether*	100
	111762	*Ethylene glycol monobutyl ether*	200
	110805	*Ethylene glycol monoethyl ether*	50
	111159	*Ethylene glycol monoethyl ether acetate*	100
	109864	*Ethylene glycol monomethyl ether*	10
	110496	*Ethylene glycol monomethyl ether acetate*	200
	2807309	*Ethylene glycol monopropyl ether*	100
	107982	*Propylene glycol monomethyl ether*	200
	108656	*Propylene glycol monomethyl ether acetate*	100
	112492	*Triethylene glycol dimethyl ether*	100
42	118741	Hexachlorobenzene	0.1
43	608731	Hexachlorocyclohexanes	0.1
	319846	*alpha-Hexachlorocyclohexane*	0.1
	319857	*beta-Hexachlorocyclohexane*	0.1
	58899	*Lindane {gamma-Hexachlorocyclohexane}*	0.1
44	110543	Hexane	200
45	302012	Hydrazine	0.01
46	7647010	Hydrochloric acid	20
73	7664393	Hydrogen fluoride (hydrofluoric acid)	50
47	7783064	Hydrogen sulfide	5
48	1125	Isocyanates and diisocyanates	0.05
	822060	*Hexamethylene-1,6-diisocyanate*	0.05
	624839	*Methyl isocyanate*	1
	101688	*Methylene diphenyl diisocyanate {MDI} [POM]*	0.1
	1204	*Toluene diisocyanates*	0.1
	584849	*Toluene-2,4-diisocyanate*	0.1
	91087	*Toluene-2,6-diisocyanate*	0.1
15	7439921	Lead compounds (inorganic)	0.5
49	7439965	Manganese	0.1

(continued)

Table A-1. (continued)

TAC Code	CAS Number	Substance	Degree of Accuracy (lbs/yr)
50		Mercury and mercury compounds	
	7487947	*Mercuric chloride*	1
	7439976	*Mercury*	1
	593748	*Methyl mercury {Dimethylmercury}*	1
51	67561	Methanol	200
52	74873	Methyl chloride {Chloromethane}	20
23	71556	Methyl chloroform {1,1,1-Trichloroethane}	1
53	78933	Methyl ethyl ketone {2-Butanone}	200
54	108101	Methyl isobutyl ketone {Hexone}	20
55	1634044	Methyl tert-butyl ether	200
16	75092	Methylene chloride {Dichloromethane}	50
17	7440020	Nickel	0.1
57	106467	p-Dichlorobenzene {1,4-Dichlorobenzene}	5
19	1151	PAHs, total, w/o individ. components reported [PAH, POM]	0.2
	83329	*Acenaphthene [PAH, POM]*	1
	208968	*Acenaphthylene [PAH, POM]*	1
	120127	*Anthracene [PAH, POM]*	1
	56553	*Benz[a]anthracene [PAH, POM]*	0.5
	50328	*Benzo[a]pyrene [PAH, POM]*	0.05
	205992	*Benzo[b]fluoranthene [PAH, POM]*	0.5
	192972	*Benzo[e]pyrene [PAH, POM]*	0.5
	191242	*Benzo[g,h,i]perylene [PAH, POM]*	0.5
	205823	*Benzo[j]fluoranthene [PAH, POM]*	0.5
	207089	*Benzo[k]fluoranthene [PAH, POM]*	0.5
	218019	*Chrysene [PAH, POM]*	1
	53703	*Dibenz[a,h]anthracene [PAH, POM]*	0.1
	192654	*Dibenzo[a,e]pyrene [PAH, POM]*	0.05
	189640	*Dibenzo[a,h]pyrene [PAH, POM]*	0.001
	189559	*Dibenzo[a,i]pyrene [PAH, POM]*	0.001
	191300	*Dibenzo[a,l]pyrene [PAH, POM]*	0.001
	206440	*Fluoranthene [PAH, POM]*	0.5
	86737	*Fluorene [PAH, POM]*	0.5
	193395	*Indeno[1,2,3-cd]pyrene [PAH, POM]*	0.5
	91576	*2-Methyl naphthalene [PAH, POM]*	1
	91203	*Naphthalene [PAH, POM]*	0.1
	198550	*Perylene [PAH, POM]*	0.5
	85018	*Phenanthrene [PAH, POM]*	0.5
	129000	*Pyrene [PAH, POM]*	0.5
56	1336363	PCBs (Polychlorinated biphenyls) [POM]	0.01
58	87865	Pentachlorophenol	10
18	127184	Perchloroethylene {Tetrachloroethene}	5
59	7723140	Phosphorus	0.1

(continued)

Table A-1. (continued)

TAC Code	CAS Number	Substance	Degree of Accuracy (lbs/yr)
		Phosphorous compounds	
	7803512	*Phosphine*	0.01
	7664382	*Phosphoric acid*	50
	10025873	*Phosphorus oxychloride*	0.1
	10026138	*Phosphorus pentachloride*	0.1
	1314563	*Phosphorus pentoxide*	0.1
60	7719122	*Phosphorus trichloride*	0.1
	126738	*Tributyl phosphate*	100
	78400	*Triethyl phosphine*	100
	512561	*Trimethyl phosphate*	100
	78308	*Triorthocresyl phosphate [POM]*	0.5
	115866	*Triphenyl phosphate [POM]*	100
	101020	*Triphenyl phosphite [POM]*	100
		POMS and PAH-derivatives	
	226368	*Dibenz[a,h]acridine [POM]*	0.5
	224420	*Dibenz[a,j]acridine [POM]*	0.5
	194592	*7H-Dibenzo[c,g]carbazole*	0.05
	57976	*7,12-Dimethylbenz[a]anthracene [PAH-Derivative, POM]*	0.0001
	42397648	*1,6-Dinitropyrene [PAH-Derivative, POM]*	0.001
	42397659	*1,8-Dinitropyrene [PAH-Derivative, POM]*	0.05
61	56495	*3-Methylcholanthrene [PAH-Derivative, POM]*	0.001
	3697243	*5-Methylchrysene [PAH-Derivative, POM]*	0.05
	101779	*4,4'-Methylenedianiline (and its dichloride) [POM]*	0.1
	602879	*5-Nitroacenaphthene [POM]*	1
	7496028	*6-Nitrochrysene [PAH-Derivative, POM]*	0.001
	607578	*2-Nitrofluorene [PAH-Derivative, POM]*	5
	5522430	*1-Nitropyrene [PAH-Derivative, POM]*	0.5
	57835924	*4-Nitropyrene [POM]*	1
62	75569	Propylene oxide	10
63	91225	Quinoline	100
		Selenium and compounds	
64	7783075	*Hydrogen selenide*	0.1
	7782492	*Selenium*	0.5
	7446346	*Selenium sulfide*	0.1
65	1310732	Sodium hydroxide	2
66	100425	Styrene	100
24	79345	1,1,2,2-Tetrachloroethane	1
		Sulfuric acid and oleum	
67	8014957	*Oleum*	100
	7664939	*Sulfuric acid*	2
	7446719	*Sulfur trioxide*	100
68	108883	Toluene	200
25	79005	1,1,2-Trichloroethane {Vinyl trichloride}	1
20	79016	Trichloroethylene	20
26	95636	1,2,4-Trimethylbenzene	5

(continued)

Table A-1. (concluded)

TAC Code	CAS Number	Substance	Degree of Accuracy (lbs/yr)
69	51796	Urethane {Ethyl carbamate}	0.1
21	75014	Vinyl chloride	0.5
70	1330207	Xylenes	200
	108383	*m-Xylene*	200
	95476	*o-Xylene*	200
	106423	*p-Xylene*	200
71	75456	Chlorodifluoromethane {Freon 22}	200

Appendix B
Elements of Air Toxics Inventory Report

1. Report Summary (hard copy)

- Facility name, ID, and location
- Facility plot plan identifying: emission source location, property line, horizontal scale, building heights and dimensions
- Facility total emission rate by substance for all emittants including the following information (OEHHA Guidelines Appendix A-I Substances must be quantified in the inventory report):
  - substance name and CAS number
  - annual average emission for each substance (lb/yr & g/s)
  - maximum one-hour emissions for each substance (lbs/hr & g/s)
- Supporting documentation such as source test report and approval letter if emissions are measured

2. Using HARP to provide facility, device, process, emissions, and stack data in electronic transaction file, EXPORT.TRA, including but not limited to the following information:

- Source identification number used by the facility
- Source name
- SCAQMD permit number, if available
- Source location using UTM coordinates (in meters) be sure to indicate the projection assumed (e.g., NAD 1927, NAD 1983, etc.)
- Source base elevation (m)
- Source height (m)
- Source dimensions (e.g., stack diameter, building dimensions, area/volume size, etc.) (m)
- Stack gas exit velocity (m/s) if applicable
- Stack gas volumetric flow rate (ACFM) if applicable
- Stack gas exit temperature (K)
- Number of operating hours per day
- Number of operating days per week
- Number of operating weeks per year
- Report emission control equipment and efficiency by source and by substance. The description should be brief.
- Report annual average and maximum hourly emission rates for each toxic substance for each source
- Report emission inventory methods indicating whether emissions are measured or estimated

Appendix C
Outline for the Health Risk Assessment Report

I. Table of Contents

- Section headings with page numbers indicated.
- Tables and figures with page numbers indicated.
- Definitions and abbreviations. Must include a definition of acute, chronic, and cancer health impacts.
- Appendices with page numbers indicated.

II. Executive Summary

- Name of facility and the complete address.
- Facility ID number
- Description of facility operations and a list identifying emitted substances, including a table of maximum 1-hour and annual emissions in units of lbs/hr and lbs/yr, respectively.
- List the multipathway substances and their pathways.
- Text presenting overview of dispersion modeling and exposure assessment.
- Text defining dose-response assessment for cancer and noncancer health impacts and a table showing target organ systems by substance for noncancer impacts.
- Summary of results. Potential cancer risks for residents must be based on 70-year, Tier-1 analysis and potential cancer risks for workers must be based on 40-year, Tier-1 analysis.
    - Location (address or UTM coordinates) and description of the off-site point of maximum impact (PMI), maximum exposed individual resident (MEIR), and maximum exposed individual worker (MEIW). See Attachment A for the required summary form.
    - Location (address or UTM coordinates) and description of any sensitive receptors that are above a cancer risk of ten in one million or above a noncancer health hazard index of one.
    - Text presenting an overview of the total potential multipathway cancer risk at the PMI, MEIR, MEIW, and sensitive receptors (if applicable). Provide a table of cancer risk by substance for the MEIR and MEIW. Include a statement indicating which of the substances appear to contribute to (i.e., drive) the potential health impacts. In addition, identify the exposure pathways evaluated in the HRA.
    - Provide a map of the facility and surroundings and identify the location of the MEIR, MEIW, and PMI.
    - Provide a map of 70-year lifetime cancer risk zone of impact (i.e., 1 in one million risk contour), if applicable. Also show the 10, 25, and 100 in one million risk contours, if applicable.

- Text presenting an overview of the acute and chronic noncancer hazard quotients or the (total) hazard indices for the PMI, MEIR, MEIW, and sensitive receptors. Include separate statements (for acute and chronic exposures) indicating which of the substances appear to drive the potential health impacts. In addition, clearly identify the primary target organ(s) that are impacted from acute and chronic exposures.
- Identify any subpopulations (e.g., subsistence fishers) of concern.
- Table and text presenting an overview of estimates of population exposure.
- Version of the Risk Assessment Guidelines and computer program(s) used to prepare the risk assessment.

III. Main Body of Report

A. Hazard Identification

- Table and text identifying all substances emitted from the facility. Include the CAS number of substance and the physical form of the substance if possible. The complete list of the substances to be considered is contained in Appendix A of *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (August 2003)*.[5]
- Table and text identifying all substances that are evaluated for cancer risk and/or noncancer acute and chronic health impacts. In addition, identify any substances that present a potential cancer risk or chronic noncancer hazard via noninhalation routes of exposure.
- Describe the types and amounts of continuous or intermittent predictable emissions from the facility that occurred during the reporting year. As required by statute, releases from a facility include spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping (fugitive), leaching, dumping, or disposing of a substance into ambient air. Include the substance(s) released and a description of the processes that resulted in long-term and continuous releases.

B. Exposure Assessment

This section describes the information related to the air dispersion modeling process that should be reported in the risk assessment. In addition, doses calculated by pathway of exposure for each substance should be included in this section. The educated reader should be able to reproduce the risk assessment without the need for clarification. The location of any information that is presented in appendices, on electronic media, or attached documents that supports information presented in this section, must be clearly identified by title and page number in this section's text and in the document's table of contents.

B.1. Facility Description

Report the following information regarding the facility and its surroundings:

- Facility name
- Facility ID
- Facility location (i.e., address)
- Local topography
- Facility plot plan identifying: emission source locations, property line, horizontal scale, building heights and dimensions
- Description of the site/route dependent exposure pathways. Provide a summary of the site-specific inputs used for each pathway (e.g., water or grazing intake assumptions). This information may be presented in the appendix with the information clearly presented and cross-referenced to the text.

B.2. Emissions Inventory

Report the following information regarding the facility's sources and emissions in table format; see Appendix K of OEHHA Guidelines (2003).[5] Depending on the number of sources and/or pollutants, this information may be placed in the main body of the report or in an appendix.

- Source identification number used by the facility
- Source name
- Source location using UTM coordinates (in meters); be sure to indicate the projection assumed (e.g., NAD 1927, NAD 1983, etc.)
- Source base elevation (m)
- Source height (m)
- Source dimensions (e.g., stack diameter, building dimensions, area/volume size, etc.) (m)
- Stack gas exit velocity (m/s) if applicable
- Stack gas volumetric flow rate (ACFM) if applicable
- Stack gas exit temperature (K)
- Number of operating hours per day and per year
- Number of operating days per week
- Number of operating days or weeks per year
- Report emission control equipment and efficiency by source and by substance. The description should be brief.

- Report emission inventory methods indicating whether emissions are measured or estimated
- Report emission rates for each toxic substance, grouped by source, in table form including the following information (see Appendix K of OEHHA Guidelines, 2003). Depending on the number of sources and/or pollutants, this information may be placed in the main body of the report or in an appendix.
  - Source name
  - Source identification number
  - Substance name and CAS number
  - Annual average emissions for each substance (lbs/yr & g/s). Radionuclides are reported in Curies/yr.
  - Maximum one-hour emissions for each substance (lbs/hr & g/s). Radionuclides are reported in millicuries/yr.
- Report facility total emission rates by substance for all emittants including the following information (see Appendix K of OEHHA Guidelines, 2003). This information should be in the main body of the report.
  - Substance name and CAS number
  - Annual average emissions for each substance (lbs/yr & g/s). Radionuclides are reported in Curies/yr.
  - Maximum one-hour emissions for each substance (lbs/hr & g/s). Radionuclides are reported in millicuries/yr.

B.3. Air Dispersion Modeling

- The HRA should indicate the source and time period of the meteorological data used. Include the meteorological data electronically with the HRA. The SCAQMD has 1981 meteorological data (i.e., hourly winds, atmospheric stability, and mixing heights) at 35 stations in the South Coast Air Basin. This data can be downloaded from the SCAQMD web site.[7]
- Include proper justification for using the meteorological data. The nearest representative meteorological station should be chosen for modeling. Usually this is simply the nearest station to the facility; however, an intervening terrain feature may dictate the use of an alternate site.
- HARP should be used for all health risk assessments prepared for the AB2588 Program. Make sure that the latest version of the program is used.
- Table and text that specifies the following information:
  - Selected model options and parameters
  - Receptor grid spacing
- For the PMI, MEIR, MEIW, and any sensitive receptors required by the SCAQMD, include tables that summarize the annual average concentrations calculated for all substances.

- For the PMI, MEIR, MEIW, and any sensitive receptors required by the SCAQMD, include tables that summarize the maximum one-hour; maximum four-, six-, or seven-hour (for those substances with RELs based on those averaging periods); and 30-day average (lead only) concentrations.

C. Risk Characterization

HARP generates the risk characterization data needed for the outline below. Any data needed to support the risk characterization findings should be clearly presented and referenced in the text and appendices. A listing of HARP output files that meet these HRA requirements are provided in this outline under the section entitled "Appendices." All HARP files should be included in the HRA. Ideally, the HRA report and a summary of data used in the HRA should be on paper and all data and model input and output files should be provided electronically (i.e., CD).

The potential cancer risk for the PMI, MEIR, and sensitive receptors of interest must be presented in the HRA's text, tables, and maps using a lifetime 70-year exposure period. MEIW location should use appropriate exposure periods. For the AB2588 Program, the 70-year exposure duration should be used as the basis for residential public notification and risk reduction audits and plans. All HRAs must include the results of a Tier-1 exposure assessment. If persons preparing the HRA would like to present additional information (i.e., exposure duration adjustments or the inclusions of risk characterizations using Tier-2 through Tier-4 exposure data), then this information should be presented in separate, clearly titled, sections, tables, and text.

The following information should be presented in this section of the HRA. If not fully presented here, then by topic, clearly identify the section(s) and pages within the HRA where this information is presented.

- Description of receptors to be quantified.
- Identify the site/route dependent exposure pathways (e.g., water ingestion) for the receptor(s), where appropriate (e.g., MEIR). Provide a summary of the site-specific inputs used for each exposure pathway (e.g., water or grazing intake assumptions). In addition, provide reference to the appendix (section and page number) that contains the modeling (i.e., HARP/dispersion modeling) files that show the same information.
- Tables and text providing the following information regarding the potential multipathway cancer risks at the PMI, MEIR, MEIW, and any sensitive receptors of concern:
  - Location in UTM coordinates
  - Contribution by substance
  - Contribution by source
  - 9- and 30-year cancer risks
- Tables and text providing the following information regarding the acute noncancer hazard quotient at the PMI, MEIR, MEIW, and any sensitive receptors of concern:
  - Location in UTM coordinates

- Target organ(s)
- Contribution by substance
- Contribution by source

- Tables and text providing the following information regarding the chronic noncancer (inhalation and oral) hazard quotient at the PMI, MEIR, MEIW, and any sensitive receptors of concern:
  - Location in UTM coordinates
  - Target organ(s)
  - Contribution by substance
  - Contribution by source

- Table and text presenting estimates of population exposure. Tables should indicate the number of persons exposed to a total cancer risk greater than 10^{-6}, 10^{-5}, 10^{-4}, etc. and total hazard quotient or hazard index greater than 0.5, 1.0, 3.0, and 5.0. Total excess cancer burden should also be provided.

- Provide maps that illustrate the HRA results as noted below. The maps should be an actual street map of the area impacted by the facility with UTM coordinates and facility boundaries clearly labeled. This should be a true map (i.e., one that shows roads, structures, etc.), drawn to scale, and not just a schematic drawing. U.S. Geologic Survey 7.5 minute maps are usually the most appropriate choice. The following maps are required:
  - Locations of the PMI, MEIR, MEIW, and sensitive receptors for the cancer and noncancer acute and chronic risks. Also show the facility emission points and property boundary.
  - Total multipathway cancer risk contours for the following risk levels: 100, 25, 10, and 1 in a million. Maps should be provided for the minimum exposure pathways (i.e., inhalation, soil ingestion, dermal exposure, and breast-milk consumption) and for all applicable exposure pathways (i.e., minimum exposure pathways plus additional site/route specific pathways). Include the facility location on the maps.
  - Noncancer acute and chronic hazard index contours for the following levels: 5.0, 3.0, 1.0 and 0.5. Include the facility location.

- The risk assessor may want to include a discussion of the strengths and weaknesses of the risk analyses and associated uncertainty directly related to the facility HRA.

- If appropriate, comment on the possible alternatives for control or remedial measures.

- If possible, identify any community concerns that influence public perception of risk.

D. References

IV. Appendices

The appendices should contain all data, sample calculations, assumptions, and all modeling and risk assessment files that are needed to reproduce the HRA results. Ideally, a summary of data used in the HRA will be on paper and all data and model input and

output files will be provided electronically (e.g., CD). All appendices and the information they contain should be referenced, clearly titled, and paginated. The following are potential appendix topics unless presented elsewhere in the HRA:

- List of all receptors in the zone of impact and their associated risks.
- Emissions by source.
- Census data.
- Maps and facility plot plan.
- All calculations used to determine emissions, concentrations, and potential health impacts at the PMI, MEIR, MEIW, and sensitive receptors.
- Presentation of alternate risk assessment methods (e.g., alternate exposure durations, or Tier-2 to Tier-4 evaluations with supporting information).

V. Computer Files

The list of computer files that must be submitted on CD with the HRA is as follows:

- Provide facility, device, process, emissions, and stack data in electronic transaction file, EXPORT.TRA
- ISC workbook file with all ISC parameters (filename.ISC).
- ISC input file generated by HARP when ISC is run (filename.INP).
- ISC output file generated by HARP when ISC is run (filename.OUT).
- ISC binary output files; holds χ/Q values for each hour (filename.BIN).
- List of error messages generated by ISC (filename.ERR).
- Source-receptor file; contains lists of sources and receptors for the ISC run; file generated by HARP when ISC is run (filename.SRC).
- Point estimate risk values generated by HARP; this file is updated automatically each time you perform one of the point estimate risk analysis functions (filename.RSK).
- Average and maximum χ/Q values for each source-receptor combination; values are generated by ISC (filename.XOQ).
- Plot file generated by ISC (filename.PLT).
- Representative meteorological data used for the facility air dispersion modeling (filename.MET).
- Site-specific parameters used for all receptor risk modeling (filename.SIT).
- Map file used to overlay facility and receptors (filename.DEB).
- Standard report set (filename.TXT, 21 reports)

Appendix D

HRA Review Check List

The check list contained here is used by SCAQMD staff to standardize the review of HRAs. It is being provided to assist facilities and consultants in their risk assessment preparation.

Facility Name: _____ Facility ID: _____

Street Address: _____

City: _____ Zip Code: _____

HRA Consultant: _____ Reviewer: _____

Dispersion Modeling

1. ISC Files
   a. Meteorology Input File _____
      Using Figure 1 and Table 1 the meteorological site should be the one closest to the facility.
      i. Closest to facility Yes___ No___
      ii. If not, is there a valid justification? Yes___ No___
2. Control
   a. Pollutant
      i. Pollutant ID (should be "Other") Yes___ No___
      ii. Half Life (should be "-1") Yes___ No___
   b. Model Options
      i. Use regulatory default (should be "No") Yes___ No___
      ii. Rural or Urban (should be "Urban") Yes___ No___
      iii. Gradual Plume Rise (should be "No") Yes___ No___
      iv. Stack tip downwash (should be "Yes") Yes___ No___
      v. Buoyancy induced dispersion (should be "Yes") Yes___ No___
      vi. Calms processing (should be "No") Yes___ No___
      vii. Missing data processing (should be "No") Yes___ No___
   c. Building Downwash
      i. Include building downwash? (should be "Yes") Yes___ No___
      ii. Lowbound Option? (should be "No") Yes___ No___
   d. Terrain
      i. Terrain model (should be "Both") Yes___ No___
      ii. Terrain Heights (should be "ELEV") Yes___ No___
      iii. Terrain Elevation Units (should be "FEET") Yes___ No___
   e. Averaging times
      i. 1-Hour (should be "Yes") Yes___ No___
      ii. 3-Hour Yes___ No___
      iii. 8-Hour Yes___ No___
      iv. 24-Hour Yes___ No___
      v. Monthly Yes___ No___
      vi. Period (should be "Yes") Yes___ No___
      vii. Annual Yes___ No___
3. Sources
   a. Source and building locations agree with the plot plan Yes___ No___
   b. Stack heights are reasonable Yes___ No___
   c. Volume/area source dimensions are reasonable Yes___ No___
   d. Stack parameters are consistent with those provided in the report Yes___ No___

4. Receptors
    a. Grid receptors
        i. Included (should be "Yes") Yes___ No___
        ii. Spacing (should be no greater than 100 meters) Yes___ No___
            - Assumed spacing _____ meters
        iii. Elevations included (should be "Yes") Yes___ No___
    b. Property boundary receptors
        i. Included (should be "Yes") Yes___ No___
        ii. Spacing follows guidance in Table 2 Yes___ No___
            - Assumed spacing _____ meters
        iii. Elevations included (should be "Yes") Yes___ No___
    c. Sensitive receptors
        i. Included (should be "Yes" if cancer risks >1 in a million) Yes___ No___
        ii. Elevation included (should be "Yes") Yes___ No___
        iii. Verified from review of Thomas Guide or other source Yes___ No___
    d. Census block receptors
        i. Included (should be "Yes" if cancer risks >1 in a million) Yes___ No___
        ii. Elevation included (should be "Yes") Yes___ No___
    e. Pathway receptors included (should be "No") Yes___ No___
5. Emission Rates
    a. Include rate factors (should be "No") Yes___ No___
6. Deposition and Depletion
    a. Include deposition in ISC run (should be "No") Yes___ No___
    b. Dry depletion (should be "No") Yes___ No___
    c. Wet depletion (should by "No") Yes___ No___
7. Duplication of ISCST3 Results
    a. Independently ran ISCST3 Yes___ No___
    b. Average χ/Q first high values for each source group reproduced (not required; useful if diagnosing discrepancies) Yes___ No___
    c. Maximum 1-hour χ/Q first high values for each source group reproduced (not required; useful if diagnosing discrepancies) Yes___ No___

Residential Risk Assessment

1. Enabled Pathways and Related Variables
    a. Drinking water (not required) Yes___ No___
    b. Fish water (not required) Yes___ No___
    c. Beef/dairy (pasture) (not required) Yes___ No___
    d. Home grown produce (required; should be "Yes") Yes___ No___
    e. Pigs, chickens, and/or eggs (not required) Yes___ No___
    f. Dermal absorption (required; should be "Yes) Yes___ No___
    g. Soil Ingestion (required; should be "Yes") Yes___ No___
    h. Mother's milk (required; should be "Yes") Yes___ No___
    i. Deposition velocity (should be 0.02 meters per second) Yes___ No___
    j. Fraction of homegrown fruits & vegetables consumed (should be 5.2 percent) Yes___ No___

k. Exposure duration (should be 70 years) Yes___ No___
l. Cancer analysis method; should be "Derived (Adjusted)" Yes___ No___
m. Chronic non-cancer analysis method; should be "Derived (OEHHA)" Yes___ No___

2. Duplication of HARP Results
   a. Independently performed residential risk assessment Yes___ No___
   b. PMI (i.e., maximum off-site cancer risk) reproduced Yes___ No___
      i. Facility value _____ AQMD value _____
      ii. Facility location _____ AQMD location _____
      iii. Explanation if necessary _____
      _____
   c. Cancer MEIR reproduced Yes___ No___
      i. Facility value _____ AQMD value _____
      ii. Facility location _____ AQMD location _____
      iii. Explanation if necessary _____
      _____
   d. Independently verified the cancer risk isopleth map Yes___ No___
   e. Non-cancer chronic hazard index (i.e., chronic HI) reproduced Yes___ No___
      i. Facility value _____ AQMD value _____
      ii. Facility location _____ AQMD location _____
      iii. Explanation if necessary _____
      _____
   f. Independently verified the chronic HI isopleth map Yes___ No___
   g. Non-cancer acute hazard index(i.e., acute HI) reproduced Yes___ No___
      i. Facility value _____ AQMD value _____
      ii. Facility location _____ AQMD location _____
      iii. Explanation if necessary _____
      _____
   h. Independently verified the acute HI isopleth map Yes___ No___

Worker Risk Assessment

1. Enabled Pathways and Related Variables
   a. Drinking water (not required) Yes___ No___
   b. Fish water (not required) Yes___ No___
   c. Beef/dairy (pasture) (not required) Yes___ No___
   d. Home grown produce (not appropriate; should be "No") Yes___ No___
   e. Pigs, chickens, and/or eggs (not required) Yes___ No___
   f. Dermal absorption (required; should be "Yes) Yes___ No___
   g. Soil Ingestion (required; should be "Yes") Yes___ No___
   h. Mother's milk (not appropriate; should be "No") Yes___ No___
   i. Deposition velocity (should be 0.02 meters per second) Yes___ No___
   j. Exposure duration (should be 40 years) Yes___ No___
   k. Cancer analysis method; should be "Point Estimate" Yes___ No___
   l. Facility Operating conditions ____ hrs/day ____ days/week
      - GLC adjustment factor (refer to Table 4) _____
   m. Chronic non-cancer analysis method; should be "Point Estimate" Yes___ No___

2. Duplication of HARP Results
    a. Independently performed worker risk assessment Yes___ No___
    b. Cancer MEIW reproduced Yes___ No___
        i. Facility value _____ AQMD value _____
        ii. Facility location_____ AQMD location _____
        iii. Explanation if necessary _____
        _____
    c. Non-cancer chronic hazard index (i.e., chronic HI) reproduced Yes___ No___
        i. Facility value _____ AQMD value _____
        ii. Facility location _____ AQMD location _____
        iii. Explanation if necessary _____
        _____

Site Visit

- Site visit conducted Yes___ No___
  Date _____ Time _____
- Confirmed location of the MEIR (cancer) Yes___ No___
- Confirmed location of the MEIW (cancer) Yes___ No___
- Confirmed location of the MEIR (chronic HI) Yes___ No___
- Confirmed location of the MEIW (chronic HI) Yes___ No___
- Confirmed location of the PMI (acute HI) Yes___ No___

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General Overall Comments

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